MM Algebra 1 Name: _____
Mr. Villegas **Ox Expressions** Date: _____

Aim/Essential Question: **How do you write meaningful algebraic expressions?**

**Do Now:**

| | |
|---|---|
| The following algebraic expression is given:<br>M + F + C where M is the number of men in your family, F is the number of women, and C, the number of children in your family. What do you think this expression is implying?<br>Does it have an useful application?<br>How about (M)(W)(C)? Explain. | |

**Vocabulary/Concept Bank**

| Important term | Definition |
|---|---|
| | |
| | |
| | |
| | |

*As we read aloud, underline any word you think might be important. Write a question mark next to anything you don't understand. Draw a box around the question or task you are being asked to complete, if any.*

# Ox Expressions

The table defines some symbols as **variables** to represent certain quantities. For example, *F* stands for "the number of **F**amilies in a wagon train." The **boldface** letters will remind you of what each symbol represents. A specific numeric value is provided for each variable. Treat this value as constant for all cases. For example, assume that *every* wagon train contains 25 families. (These values will probably not be the actual numbers in your class wagon train.)

| Symbol | Meaning | Numeric value |
|---|---|---|
| *F* | the number of **F**amilies in a wagon train | 25 families per train |
| *M* | the number of **M**en in a family | 2 men per family |
| *W* | the number of **W**omen in a family | 1 woman per family |
| *C* | the number of **C**hildren in a family | 3 children per family |
| *V* | the number of wagons (**V**ehicles) per family | 1 wagon per family |
| *T* | the number of wagon **T**rains in one year | 150 trains per year |
| *Y* | the number of pairs (**Y**okes) of oxen per wagon | 3 yokes per wagon |
| *A* | the number of oxen (**A**nimals) per yoke | 2 oxen per yoke |
| *P* | the weight of one ox (in **P**ounds) | 1200 pounds per ox |
| *L* | the **L**oad for one wagon (in pounds) | 2500 pounds per wagon |
| G | the amount of **G**rass eaten by one ox in one day (in pounds) | 40 pounds of grass per ox per day |
| *H* | the amount of water ($H_2O$) consumed by one ox in one day (in gallons) | 2 gallons of water per ox per day |
| *B* | the amount of water (**B**everage) consumed by one person in one day (in gallons) | 0.5 gallons of water per person per day |
| *D* | the number of **D**ays on the trail | 169 days |

Using the given letters, it is possible to write many different algebraic expressions. Although you can always **substitute** numbers for the letters and do the arithmetic, most of the expressions have no real meaning.

For example, for the expression *MG*, you can multiply the number of men per family by the amount of grass an ox can eat in a day. However, the product you get doesn't have any useful application. In other words, *MG* doesn't really mean anything.

Some expressions *do* have a meaning. For example, *FC*, the number of families in a wagon train times the number of children in a family, represents the total number of children traveling in a wagon train. So the expression *FC* has meaning.

The phrase "the number of children traveling in the train" is a concise way to describe the number represented by *FC*. We will call this the **summary phrase.**

The table tells you that there are 25 families in a wagon train, so $F = 25$, and that there are 3 children in a family, so $C = 3$. Therefore, $FC = 25 \cdot 3 = 75$; there are 75 children in a wagon train. Even if the numbers were different, *FC* would still represent the number of children in a wagon train.

## Your Task

Your task is to come up with as many meaningful algebraic expressions as you can, using the symbols in the table. For each expression, go through these steps.

- Write the expression.
- Explain what the expression means, using a summary phrase.
- Give the numerical value of the expression, based on the values of the individual variables given in the table.

*Be creative! Try to come up with expressions you don't think your classmates will create.*

| Expression | Summary Phrase | Numerical Value |
|---|---|---|
| *M + W + C* | Number of people in a family | 6 |
| *FW* | Number of women per train | |
| | Number of wagons per train | 25 |
| *F (M+W+C)* | Number of people per train | |
| *FV(M+W+C)(B)* | Amount of water consumed by the people in a train | |
| *FT* | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Summary (MIP):**

| | |
|---|---|
| What are general ideas we discovered about writing a variable expression? | |

Vocabulary to be used during the discussion: Algebraic expression, Coefficient, Variable, Substitution, Evaluate, Product